

## ON THE FISHES OF THE AMBYIACU RIVER.

BY EDWARD D. COPE.

The collection on which the present examination is based was made by our correspondent at Pebas, John Hauxwell. It embraces fishes of the small streams tributary to the Ambyiacu, as well as those of the river itself. The Ambyiacu is an inconsiderable river, which empties into the Amazon near to Pebas, in Eastern Equador, some distance east of the Napo.

The results of the examination will be mentioned at the close of the list. As was to have been supposed, it consists almost exclusively of representatives of the three great families which abound in the neotropical region; the *Chromididæ*, representing Physoclystous fishes, and the *Characinidæ* and *Siluridæ*, representing the Physostomi. The number of new species, forty-five in a total of seventy-four, constitutes a considerable addition to ichthyology, especially as the number of new generic forms is also rather large.

I add a list of the species obtained by my friend Robert Perkins, of Wilmington, Delaware, on a trip between the mouth of the Rio Negro and the Peruvian Amazon or Ucayale River. There are several interesting novelties in this collection, but their special localities are, unfortunately, not preserved. The specimens generally were large, and in fine condition.

## CHROMIDIDÆ.

## PTEROPHYLLUM SCALARE, C. V.

Heckel, Ann. Wien. Mms., 1840, 334. Günther, Catal. B. M. v. 316.

Abundant in the Ambyiacu.

## GEOPHAGUS AMOENUS, Cope, sp. nov.

Allied to *G. tæniatus* (*Mesops*, Günth.). Scales in three series on the cheek; on the body, 2-25-8. Fin radii D. xv. 7, A. iii. 6. Twelfth dorsal spine less than half the length of the head; spines subequal, slightly shortening anteriorly. Prolonged soft rays of dorsal and anal extending beyond the caudal. Pectoral to, ventral beyond, base of anal. Length of head less than depth of

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body, nearly four inches in length (with caudal); depth, 3.5 times in the same. Orbit, twice preorbital bone, equal muzzle, one-fourth wider than interorbital space, one-third head.

Total length .063 m.; to basis anal .0335; do. ventral .019; do. dorsal (axial) .015 m. Color brown; a black band from orbit to basis caudal. A black spot at base, and one at tip of caudal. Basis of dorsal and anal brown, rest yellow. A black band from orbit to angle of interoperculum. Cheeks and operculum with blue spots separated by yellow lines. River Ambyiacu.

**GEOPHAGUS BADIIPINNIS**, Cope, sp. nov.

Form short oval; body deep; front steeply descending, concave between the orbits; the muzzle projecting. Depth one-half length without caudal fin; head 2.4 times in the same. Orbit 3.5 times in length of head; 1.3 times into interorbital space, which equals length of muzzle with under jaw. Preorbital bone .75 the diameter of the orbit. End of maxillary bone falling opposite the pupil. Fin rays D. xiii-12, A. iii-11. Scales 3-27-8-10; six series on the cheek; operculum scaled. Twelfth dorsal ray equal length of muzzle plus half of orbit; the rays gradually diminishing in length to the second. Caudal fin broadly scaly at base; no scales at base of second dorsal. Pectoral fin long, extending to opposite last soft dorsal ray; ventrals to third soft anal.

Color golden, blue bands on the prefrontal bone, and longitudinal shades on the scales. Dorsal fin dusky spotted, anal with numerous bay-yellow spots in vertical rows. Total length .15 m.; to origin dorsal (vertical line) .043; do. to ventral .051; do. anal .084.

This species, having the coloration of *G. jurupari*, has the orbit nearly as median as in *G. tæniatus*. I do not see the necessity of subdividing Heckel's genus *Geophagus* into three (*Geophagus*, *Satanoperca*, and *Mesops*), as has been proposed by Günther (Catal. Brit. Mus.).

**GEOPHAGUS JURUPARI**, Heckel.

*Satanoperca jurupari*, Günth. Cat. B. M. v. 313.

D. xv. 10, A. iii. 7. Scales 3-31-9; suborbitals 6 (7) rows. Preorbital bone 1.66 times orbit.

**CRENICICHLA ANTHURUS**, Cope, sp. nov.

A slender species, with brightly colored fins. Depth six times in total length, or 5.3 times in length without caudal fin. Length of head 3.66 in total length, five and two-third times more than the diameter of the orbit. Orbit 1.7 times in muzzle, 1.6 times in interorbital width, which is flat. Scales  $4\frac{1}{2}$ -36-7-13, but, as those of the lateral line are placed at intervals, the true number of transverse series of scales is 62.3; scales of cheek in nine series. Fin radii, D. xix-13; A. iii-9. Caudal cuneate rounded; pectoral and ventral coequal, not extending half-way to anal. Twelfth dorsal spine equalling from end of chin to orbit. Some rays of soft dorsal and anal prolonged, the former to near end of caudal, the latter to base.

Color leaden-brown above, fading into yellowish below. Dorsal and anal fins deep rose, with a few round small spots of pale rose on the soft portions, which become white in spirits. Caudal fin deep crimson, fading to purple at base, with a longitudinal dark shade in the centre, and series of small oval pink spots, one between each pair of rays. A black spot edged with white at the base above the lateral line, and a larger black spot, white-edged, crossing the lateral line opposite the third, fourth, and fifth dorsal spines.

Total length .215 m.; to basis dorsal (axial) .055 m.; to basis of anal .121.

This perch appears to be similar to the *C. lacustris* of Castelnau in proportions, but the coloration is very different. I have three specimens from the Ambyiacu. It is less slender than the *C. lucius*, Cope,<sup>1</sup> and has a considerably wider skull.

**CRENICICHLA PROTEUS**, Cope, sp. nov.

This species is represented by numerous specimens, which vary in many respects from an average standard, constituting several varieties, one of which may turn out to be a species. The typical or most numerous form may be thus described:—

Radii D. xix-13; A. iii. 8 or 9. Depth of body from four to four and a half times in length without caudal fin. Head 3 times in same, orbit 5 times in head, 1.25 times in muzzle, and

<sup>1</sup> Proceed. Amer. Philos. Soc., 1870, 570.

1.33 times to 1.6 times in interorbital breadth. Scales 4—56-3<sup>1</sup>—12 13, seven rows on cheek. Color olivaceous, blackish above; fins dusky, without markings, except a black ocellus at upper base of caudal fin, with pale margin. A dusky band from end of muzzle to middle of side, and dusky spot below eye. Eye red. Total length .17 m.

*Var. α.*—Shorter and stouter, colors paler. Eye 1.5 times in interorbital width. Depth of body  $3\frac{4}{5}$  to 4 times in length less caudal. Scales 4—45-8—13. Pattern of color similar to the last. Several specimens.

*Var. β.*—More slender; depth 4.66 times in length without caudal fin. Radii xviii—14; A. iii—9. Scales 4—55—13. Diameter of orbit equal interorbital space. Coloration as in the types, except a large black spot marking the posterior fourth of the spinous dorsal fin. This variety has one less dorsal spine than usual in the type, but the latter occasionally exhibits but 18.

*Var. γ (argynnis).*—Short and stout as in var. α, but the orbit is as wide as the narrowed interorbital space; scales 4—43—13. Radii D. xix. 13; A. iii. 9. The coloration is like that of the type, olive, darker above, with caudal ocellus and dusky band from muzzle to opercular margin. The dorsal fin has, however, a broad orange-red band extending along its distal posterior half, the anterior part wider and with three large black spots in the centre; in a second specimen it contains four black spots.

The preceding varieties are so connected together as to be inseparable in our system. The var. β accords to some extent with Castelnau's description of his *C. lacustris*, but our most slender forms are less elongate than this species, where the depth is one-sixth the length. There are neither black dots nor vittæ in the *C. proteus*. From *C. saxatilis*, to which it is next allied, it differs in the constantly smaller number of longitudinal scales, which are given by Günther as  $\frac{7}{14}$ .

#### UARUS INSIGNIS, Heckel.

*Mesonauta insignis*, Günther, l. c. iv. 300.

#### UARUS CENTRARCHOIDES, Cope, sp. nov.

Form a compressed broad oval. Scales ctenoid 7—29-20—14, five series on the cheek; operculum scaled. Radii D. xv—14; anal

<sup>1</sup> Not counted on lateral line.

viii-12. Caudal fin subtruncate. The middle dorsal spines appear to be longer than the posterior, but the latter with the two anterior pointed rays have been bitten nearly off, causing a deep and regular emargination of the two fins, so that the normal form is not certain. Pectoral and ventral fins extending to near the eighth anal spine. Teeth in several series in both jaws, those of the external cylindrical considerably larger. End of maxillary extending but little behind the line of the posterior nareal opening. Profile steep, concave and flat between the orbits, where its width a little exceeds the diameter of the orbit. Latter one-third of head equal length of muzzle. Depth of body 1.5 times the length without caudal fin.

Color dusky, with seven vertical blackish bars extending below the basis of the dorsal fin, which break into spots on the belly; a cross-bar through eye, and one across base of tail. Soft dorsal with whitish cross-bars, other fins blackish.

Total length .074 m.; to line of D. I. .02 m.; to line of A. I. .03; to basis of caudal .055.

This species is intermediate in characters in some respects between the species referred by Günther to *Uarus*, Heckel ("*Uaru*"), and those referred to *Mesonauta*, Günther. I fail to perceive any characters on which to establish the latter, and accordingly regard its species as referable to the present genus.

#### HEROS BIMACULATUS, Linn.

*Acara bimaculata*, Günther, l. c. 276; *A. gronovii*, *punctata et margarita*, Heckel fide Günther.

This appears to be the only species of the *Acaras* of Günther which possesses four anal spines, the remaining species possessing three. *Heros*, Heckel, is distinguished, according to the same, by the possession of five spines in the anal fin. Out of eighteen specimens of the present fish from the Ambyiaen, four possess five spines, the remainder four; I am therefore disposed to define *Acara* as having three, and *Heros* as having four or five anal spines, though it is possible that it will be found necessary to unite the two genera.

**ACARA TETRAMERUS**, Heckel.

Günther, Catal. iv. 277.

**ACARA SYSPILUS**, Cope, sp. nov.

Scales in three series on the cheek, on the body 2-26-7. Radii D. xiv-xv. 9; A. iii. 8; caudal rounded. Form elongate oval; depth of body 2.6 times in length without caudal fin, and equal depth of head. Preorbital bone half orbit (in specimen two inches long); orbit 2.5 times, head nearly twice interorbital space (doubtless much smaller in larger specimens). Profile convex; muzzle oblique; upper lip longer than mandible.

Light brown, yellow below. A straight wide black band from the upper posterior margin of the orbit to below the end of the spinous dorsal, composed of three confluent spots; a black bar from eye to angle of preoperculum, and another across the base of the caudal fin. Seven vertical brown cross shades behind the head, on sides.

**ACARA FLAVILABRIS**, Cope.

Proc. Amer. Phil. Soc., 1870.

Scales in two series on cheek; on body 2-24-8. Radii D. xvi. 9-10; A. iii. 7. Depth 2.25 times, head 2.8 times in length less caudal fin. Eye three times length of preorbital bone, and 2.6 times in head in specimen 2.5 inches long, jaws equal. Seventh dorsal spine as long as diameter of orbit or interorbital width. Profile gently convex, inferior outline rising to meet it.

Olive, with jointed unpaired fins yellow. A large black spot before middle of side on lateral line, a vertical shade at base of caudal.

As compared with *A. dimerus*, its closest ally, this fish differs in the fewer anal radii, the lack of cross-bars, etc. It was originally described by me as having three rows of cheek scales; but those of the interoperculum were included.

**ACARA FRENIFERUS**, Cope, sp. nov.

Scales of cheek in two series; of body 2-29-8-9. Radii D. xvi. 10-11; A. iii. 8. Form elongate oval, the depth entering the length (less caudal) 2.33 times. Front convex, descending, length of head one-third length. Orbit equal muzzle 3.33 times in head, 1.5 times in the flat front. Dorsal spines short, twelfth equalling 1872.]

diameter of orbit. Pectoral not reaching anal; soft anal and dorsal not quite reaching end of caudal; latter rounded.

Color rich brown, with a black spot under the middle of the dorsal fin, which is connected with the orbit by a broad black band. The body is further crossed by five darker shades. Fins dusky. Below brown, under lip yellow.

Total length .117 m. to line of D. i. .027; do. of anal .058.

Several specimens from the Ambyiacu. This species is, with *A. dimerus*, Heckel, and *A. flavilabris*, Cope, the only one with two series of cheek scales. It differs from the first named in the much fewer fin radii, etc.

#### ACARA COMPRESSUS, Cope.

Scales 35, transverse series, seven rows on the cheek. Radii D. xiii-19; A. iii-15. Longest dorsal spine as long as muzzle and half the orbit. Form oval, depth half length less caudal, body compressed. Profile oblique, nearly straight from in front of dorsal fin. Head 2.5 times in length less caudal; orbit 3.2 times in head, larger than muzzle 1.2 times in interorbital space. Left dorsal and anal prolonged. Outer series of teeth larger. Total length .079 m.; to dorsal (axial) .024; to anal (do.) .0395; to caudal fin .0595.

Color, injured by the alcohol, at present uniform brown, with a black line from the angle of the mouth to that of the preoperculum, and two black shades, one at base and the other at end of caudal fin. Soft dorsal and anal black behind.

Two specimens from the Ambyiacu.

#### HYGROGONUS OCELLATUS, Agass.

Spix, Pisc. Brasil., tab. 68.

### CLUPEIDÆ.

#### PELLONA ALTAMAZONICA, Cope, sp. nov.

No teeth on the vomer, a distinct series on the palatine bones; the whole of the hyoid axis and tongue covered with denticerous plates. Bi-maxillary and maxillary teeth, the former considerably longer. Scales 23-77. Fin rays D. 18, A. 38-39. Dorsal fin behind the ventral, its origin nearer the basis of the caudal fin than the end of the muzzle, its last ray above the first anal ray. Length of ventral fin equal diameter of orbit. Superior caudal

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lobe shorter than inferior. Orbit entering head (with chin) four times, in muzzle once, nearly double interorbital space. Pectorals reaching beyond basis of ventrals. Cranial ridges forming a closed V in front. Length of head equal greatest depth of body, entering length 3.75 times (excl. caudal fin).

Total length .186 m; to basis of anal .093 (axial); do. ventral .061.

Silver with golden and green reflections, yellow on side of head, a black epiclavicular spot.

From the Ambyiacu. The second South American species, which is found at a great distance from salt water.

### OSTEOGLOSSIDÆ.

*OSTEOGLOSSUM BICIRRHOSUM*, Vand.

Three specimens; in one the anal and caudal fins are united.

### STERNOPYGIDÆ.

This family differs materially from the *Gymnotidæ*, with which its species have been heretofore arranged. One character is to be seen in the construction of the scapular arch. The coracoid bone is well developed, and connected by the transverse column with the clavicle, as in many other physostomous families. In the *Gymnotidæ* this column is wanting, and the coracoid is rudimental.

*STERNOPYGUS MACRURUS*, Cuv.

*STERNOPYGUS VIRESCENS*, Valenc.

*CARAPUS FASCIATUS*, Pallas.

### ERYTHRINIDÆ.

*MACRODON TRAHIRA*, Bl. Schn.

Günther, Catal. v. 281.

*HOLOTAXIS LETUS*, Cope, sp. nov.

Form elongate, scales very large, l. l. 26, l. tr. 5. Length head four times depth body, also four times in length without caudal fin. Orbit 3.3 times in length of head. Chin very prominent; maxillary teeth as large as the premaxillaries. Dorsal fin distant from muzzle 1.5 times distance from caudal. Radii D. I. 9; A. 1872.]

10; V. 8. Pectoral reaching ventrals, ventrals filamentous, reaching anal, commencing in front of dorsal. Dorsal with median rays, and caudal with longest rays filamentous.

Color, scales orange at base, with broad blackish margins forming rows of spots; dorsal fin with a black spot at middle and a large black saddle below and in front of it on the back; mandible black-edged; fins orange-red. Total length .0755 m.; to dorsal fin .0335; to ventrals .027; to anal .0416.

This is the second species of this genus, which was characterized by the writer, Proceedings Am. Phil. Soc., 1870, p. 563. It differs from the type *H. melanostomus*, in the larger scales, there being 5 in this, 7 in that, in a cross series.

### CHARACINIDÆ.

#### CURIMATUS CYPRINOIDES, Linn.

Syst. Naturæ; Günther, Cat. B. M. v. 290.

#### CURIMATUS RUTILOIDES, Kner.

Denkschr. Wien. Acad., 1859, 141. Günth. v. 290.

Both these species quite abundant.

#### PROCHILODUS INSIGNIS, Kner.

Denkschr. Wien. Acad., 1859, 147. Günth. v. 296.

D. 11, A. 10. L. l. 44, l. tr. 22. Depth 2.5 times in length; head three times. Silver-leadens above; caudal with two black cross-bands forming chevrons with the angle directed distally. Dorsal with three, anal with two dark bands. A single small specimen.

#### ANOSTOMUS FASCIATUS, Spix.

Pisc. Braz. t. 36. Günth., Cat. B. M. v. 304.

#### LEMOLYTA, Cope, gen. nov.

Allied to *Schizodon* (*Anostomus*) in all respects, *i. e.* with movable flat incisor teeth in the jaws, but differing in having the branchiostegal membranes entirely free from the isthmus. They are united to each other only, and the connecting membrane bridges the isthmus throughout its length. In the only species known to me the inferior teeth are truncate with entire margin, or incisor-like; the superior are crenate.

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**LEMOLYTA TENIATA**, Kner.

*Schizodon teniatus*, Kner. Denkschr. Ac. Wien, 1859, 159. Gthr., v. 304.

**LEPORINUS MEGALEPIS**, Günth., var.

Catal. B. M. v. 307.

Three adult specimens, two with deeper, one with shallower body. First, scales  $4\frac{1}{2}$ –35–4; head 3.5 times, depth three times in length. Second, scales 5–37–5; head 3.75, depth three times in length. Third, scales 5–38–5; head 3.75, depth 3.6 times in length. All with anal rays 10, and a minute anterior spine. Ten dark dorsal cross-bands besides the three lateral spots; the appropriate bands descending between the spots. The young are very strongly and handsomely cross-banded.

**CHARACIDIUM ETHEOSTOMA**, Cope, sp. nov.

The discovery of this little fish is interesting as extending the range of this genus over the whole of Brazil, it having been known heretofore from the neighborhood of Lagoa Santa, from a tributary of the coast river, the Rio das Velhas. Prof. Reinhardt, who discovered it, called the species from that locality *Ch. fasciatum*.<sup>1</sup> The nares are separated, the anal fin short, the teeth are simple, acute, and fixed in a single series in each jaw; none on the maxillary. Lateral line complete.

The species here described has much the coloration of the *Poecilichthys* or *Etheostoma* of our North American streams.

Depth into length 5.25 times; head 5.75 times in same. Branchiostegal membranes fissured far forwards. Dorsal fin commencing in front of ventrals R. 11; A. 8; V. 9; P. 11, reaching ventrals, ventrals reaching anal, caudal deeply forked. Scales l. l. 33, l. tr. 8; striate. Orbit equal muzzle 3.6 times in head, equal inter-orbital width, and length of muzzle; profile nearly straight, lips about equal; maxillary bone to orbit.

In spirits yellowish, probably hyaline in life, with a black lateral band from end of muzzle, and nine quadrate brown dorsal spots from nape to tail. There is more or less connection between the spots and band, and shades across the under side opposite to these. Fins unicolor, light. Sides of head silver, end of chin,

<sup>1</sup> See K. Dansk. V. Selsk. Forh., 1866, 55, Tab. II. f. 1.

and a vertical bar at base of caudal fin black. Total length .048 m.; to dorsal .0175; to anal .03; to basis caudal .039. The opercle of one of the specimens is white and smooth, of another punctate-rugose and yellow.

**IGUANODECTES**, Cope, gen. nov.

Dorsal fin originating in advance of ventrals, anal elongate. Branchiostegal membranes united across, but not with, isthmus. Teeth in two series in the premaxillary, none in the maxillary, and one row in the mandible. They are fixed, but have contracted fangs, and broad, flat, subequally denticulate crowns, and those of the mandible stand out from the dentary bones all round. Teeth of the outer row very few, minute. Caudal fin furcate.

This genus is allied to *Tetragonopterus*, but the dentition is much weaker, approaching that of the *Schizodon*; the union of the branchiostegal membranes is seen in *Læmolyta* m. In the only species there are but two minute teeth of the outer premaxillary row. The other teeth are fan-shaped and smooth, and in contact, so as to form an uninterrupted series. In *Tetragonopterus* the fangs are strong, not contracted, and the crowns are ridged.

**IGUANODECTES TENUIS**, Cope, sp. nov.

Slender, the depth entering the length (without caudal) 5.5 times, length of head 4.33 times in the same. Radii D. 12; A. 36; V. 9, P. 13. Pectoral reaching ventral and ventral anal. Orbit 3.2 times in head, equal interorbital width, less than length of muzzle. L. tr. al. A. i. 11-12. Caudal furcate. Distance from base dorsal to base caudal equal from former to pupil of eye. Color pale, a silver band along side; base of caudal blackish. Total length .059 m.; to basis dorsal .027; to basis anal .0275.

**APHYCHARAX PUSILLUS**, Gthr.

Proc. Zool. Soc. Lond., 1868, 245.

Fins bright red in life.

**TETRAGONOPTERUS CHALCEUS**, Artedi.

Agass. Cuv. Val., Gthr. Catal. v. 320.

**TETRAGONOPTERUS BARTLETTII**, Gthr.

Am. Magaz. Nat. Hist., 1866, 30.

**TETRAGONOPTERUS PHENICOPTERUS**, Cope.

D. 10; A. 26-7; ventrals originating in front of dorsal, not reaching anal; pectoral reaching ventral. Scales  $5\frac{1}{2}$ -35-4. Depth of body 3.3 times in length without caudal; length of head 4.2 times. Orbit 2.5 times in head, equal the plane interorbital space.

Silvery, with lateral silver band and indistinct scapular and basal caudal blackish spots. Anal and dorsal fins vermilion; caudal with a triangular vermilion spot which surrounds the basal black spot, and whose apex reaches the caudal emargination.

Length .053 m.; to dorsal .021; to anal .0245.

Apparently very abundant. It is allied to the *T. carolinæ* of Dr. Gill (Proc. Ac. Nat. Sci., Phila.), 1870, p. 92, but is a more slender fish with smaller head.

**STETHAPRION CHRYSSEUM**, Cope, sp. nov.

Form elevated, disciform; scales small, 19-67-16. Radii D. 12; A. 37; V. 8, very small, not reaching anal, and commencing below dorsal. Pectoral falcate reaching nearly to line of end of ventrals. Base of anal fin covered with scales, especially anteriorly; dorsal with a long decurved spine in front of it. Caudal peduncle contracted. Depth into length less caudal fin, 1.66 times, length of head 3.4 times. Orbit 2.4 times in head, much larger than muzzle's length, 1.1 times in interorbital width. Profile of head very concave. Dorsal fin elevated, caudal deeply bifurcate. Lateral line a little decurved medially.

Color silvery, a leaden shade from postscapular region to caudal fin, darkest in front at a postscapular spot. Below this band, yellow. Fins unspotted. Total length .071 m.; to dorsal fin (oblique) .03; to caudal (straight) .053; to ventrals (oblique) .032 m.

This species is near the type *S. erythroptus*, Cope (Proc. Am. Phil. Soc., 1870, p. 562, fig. 5), but has larger scales and a different coloration. The genus *Stethaprion* has the physiognomy of *Myletes*, but is essentially near to *Tetragonopterus*. It differs from the latter chiefly in the decurved spine in front of the dorsal fin, a character it shares with *Serrasalmo*.

**BRYCON CAPITO**, Cope, sp. nov.

Scales small, L. 1. 56, l. tr. 25. Depth of body one-fourth, length of head one-third of total without caudal. Radii D. 10; 1872.]

A. 25; V. 7 (8?). Dorsal originating a little behind line of ventral, pectoral reaching ventral. Orbit 2.66 times in head, equal interorbital width. Middle series of premaxillary teeth continued outwards as far as the exterior. Posterior pair of mandibular teeth very small. Color leaden, head silvery, a scapular and large basal caudal black spot.

Total length .06 m., to dorsal fin .0275, to anal .034.

**CHALCEUS MACROLEPIDOTUS**, Cuvier.

Cuv. Val. xxii. 240. Günther, Cat. B. M. v. 333.

Two teeth only in posterior mandibular series.

**CHALCEUS ERYTHRURUS**, Cope.

*Plethodectes erythrurus*, Cope, Proc. Am. Phil. Soc., 1870, p. 563, fig. 6.

This species belongs to *Chalceus*, but differs from the type in having scales of equal size. Günther says of this genus in his analytical key, "anal fin more or less elongate," as distinguished from "anal short" of *Piabucina*, yet *C. macrolepidotus* has as many anal radii as *P. erythrinoides*. *Creagrutus*, with a fin of about the same length, is placed in the "elongate" anal division.

**MEGALOBRYCON MELANOPTERUM**, Cope, sp. nov.

Rather stout; dorsal outline arched. Length of head three and three-fifths times in total lacking caudal fin, depth three times in same. Orbit large, equal muzzle, 3.5 times in head. Radii D. 11; A. 25; V. 8, commencing opposite the third or fourth dorsal ray. Pectoral just reaching ventral. Scales l.l. 67, exposed surface striate. Interorbital width 1.6 times diameter of orbit, gently convex, less than postorbital length of head. Premaxillary teeth in three series, the outer small, not in contact, equal to the maxillaries, and simple or with a minute cusp on each side; ten in number on each bone. The posterior series is uninterrupted from side to side, including six teeth on each side; the median row forms an open **M**, the angles forwards. Caudal fin deeply forked.

Total length seven inches, = m. .176; length to dorsal fin .071 m. (straight); to anal .10 m. Color silvery, with a black band which commences between the ventral fins, on each side of the base of the anal, across the caudal peduncle, and along the middle of the upper lobe of the caudal fin to its end; anal black at base, other

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fins white. A black scapular spot, and a crimson spot at the apex of each operculum. Opercular bones with purple reflections. The *Ambyiaeu*.

This genus was proposed by Günther, in 1869 (Proc. Zool. Soc., p. 424), on the type species, *M. cephalus*. This fish is evidently nearly allied to the species here described, but is different from them in the larger size of the external series of premaxillary teeth, since they are, according to Günther, double the size of the maxillaries, nearly in contact, and apparently more denticulate. It is about as stout as the present fish, but the arrangement of the posterior series of teeth is similar to the *M. erythropterus*. I have two specimens of the *M. melanopterus*, and they agree in every detail.

**MEGALOBRYCON ERYTHROPTERUM**, Cope, sp. nov.

More elongate; length of head equal depth, and one-fourth the length without caudal. Orbit large, 3.5 times in head, 1.8 times in interorbital width. Radii D. 11; A. 23; V. 8, commencing opposite a point equal to five radii in front of the dorsal fin. Pectorals 12, not reaching ventrals. Squamation injured, lateral line estimated 70. Teeth similar to the last, except that there are twelve premaxillaries on each side, and that those of the posterior row at each end, instead of being continuous with the larger median teeth of that row, are continuous with the lateral limbs of the median **M**-shaped row, as in *M. cephalus*.

Total length  $7\frac{3}{4}$  inches, = .19 m., to dorsal fin .086 m., to anal .115. Color pale and uniform, with a black scapular and large basal caudal spot, which is prolonged as a band to the margin of the fin. Rest of caudal and all the other fins, except base of dorsal, crimson. Sides of head with pearly purple reflections.

Though the characters separating these species are few, they are important. They are found in the form of body, position of dorsal fin, anal radii, color, and dentition.

From the *Ambyiaeu*.

**TRIPORTHEUS**, Cope, gen. nov.

Dorsal short, anal elongate. Teeth in three series on the premaxillary bone, denticulate, in two rows on the mandible, the posterior of the latter consisting of two convex median teeth. Pectoral region compressed and keel-shaped on account of the 1872.]

development of the coracoid bones; abdomen compressed. Dorsal fin behind the line of the ventrals.

This genus has a considerable resemblance to *Chalcinus*, and is intermediate between it and *Chalcinopsis*, Kner. The former has two series of premaxillary teeth, the latter four; the present possesses three. The *Chalcinopsis alburnus*, Gthr., probably belongs to *Triportheus*.

**TRIPORTHEUS ALBUS**, Cope, sp. nov.

Teeth of the premaxillary closely packed, many denticulate; chin projecting beyond muzzle when the mouth is closed. Radii D. 11; A. 27; ventrals longer, extending to beyond the last ray of the dorsal. Pectorals falcate, not quite reaching end of ventrals. Caudal deeply emarginate. Scales large l. l. 28, five series above the lateral line. Head 3.5 times in length without caudal; orbit large, exceeding interorbital width a little, and three times in length of head (including chin).

Color dark ashen above, sides and below silver-white; a dark spot at basis of caudal fin. Total length m. .061; length to basis of dorsal fin .0292; from D. I. to basis caudal .02. The dorsal outline of this species is regularly arched.

From the Ambyiacu.

**TRIPORTHEUS FLAVUS**, Cope, sp. nov.

Premaxillary teeth spaced, the anterior series in contact only exteriorly. When the mouth is closed the chin projects but little, and the profile of the head descends obliquely from that of the back. Latter gently arched. Radii D. 11; C. 20; A. 30; V. 7; P. 11. Ventrals short, scarcely reaching the line of the last dorsal ray, pectorals sometimes attaining that point. Caudal subtruncate. Head one-fourth length without caudal, eye 3.25 times in head, equal interorbital space .75 times in muzzle. Depth at ventral fin three times in length. Scales at ventral 6-34-5-3.

Total length 6.25 inches, = .157 m. Length to D. I. .08, to anal .093; to caudal .132; depth at pectoral .044. Color brownish-yellow, with golden reflections; four shaded lines above on the middles of the scale series; above with steel-blue reflections; a black band through the middle of the caudal.

Numerous specimens. In a young one of three inches the caudal fin is deeply furcate, as in *C. albus*; perhaps in larger specimens of the latter the tail is also subequal.

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**CHALCINUS CULTER**, Cope, sp. nov.

An elongate species, with very posterior dorsal fin. Height at pectoral fin 4.33 times, at ventral five times, in length without caudal fin. Head 3.75 times in the same; orbit 3.8 in head and 1.2 in interorbital space. Head above flat in one plane from end of muzzle to dorsal fin. Teeth small tricuspid, those of exterior row not in contact with each other. Dorsal fin short, its last ray opposite first anal; distance from base of caudal a little more than half distance from end of muzzle. Pectorals falcate, reaching nearly to line of dorsal. Radii D. 11; C. 19; A. 33; V. 8; P. 11. The inferior caudal rays are shorter than the median and superior; ventrals reach to line of dorsal. The operculum is nearly as long as high. Scales 7-40-3.

Color pale golden; head silver, the upper part of the operculum with steel-blue reflections, bounded by a groove. A round black spot on base of median caudal rays.

Total length .158 m.; length to dorsal fin .087, to anal .098.

This species is nearest the *C. nematurus*, Kner, but differs from it in many important respects.

**GASTEROPELECUS STELLATUS**, Kner.

Denkschr. Ac. Wiss. Wien., 1860, 17 Tab. I. f. 2; Günther, Catal. B. M. v. 343.

**RCEBOIDES MYERSII**, Gill.

Proc. Ac. Nat. Sci. Phila., 1870, p. 92.

D. 11, A. 52; scales 22-83-22. Head 3.4 times in length. Prof. Gill does not give the number of scales in his description, and our fishes differ from his in the less depth, which enters the length 2.7 times instead of 2.5, and the larger eye, which enters the head three times instead of 3.5 times.

**RCEBOIDES RUBRIVERTEX**, Cope, sp. nov.

Radii D. ii., its anterior rays 1.2 times as long as the head; A. 51. Depth 2.66 times in length, length of head four times in same. Scales 27-88-19. Ventral fin reaching anal, pectoral not reaching end of ventral. Length from dorsal to near end of adipose equal from same to end of muzzle (much less in *R. myersii*). Profile gently concave above, dorsal line very convex; top and sides of head rugose. Exterior teeth 3 above, 4 below; mandi-1872.]

bulars in one row, with four canines. Two rows of premaxillaries, the posterior wanting medially. In *R. myersi* the middle row of teeth is so curved as to be continuous with the posterior series.

Scapular and caudal spots indistinct; general color pink. Top of head, maxillary bone, and opercula crimson; fins immaculate. Total length .135 m.; length to anal .059; to adipose dorsal .098; to first dorsal .057. This is a larger fish with a smaller head than the *R. myersi*. It may possibly prove to be the *R. affinis*, Günth., Pr. Z. S., Lond., 1868, 246, but he describes "anal rays 55, scales l. l. 80," and the dorsal fin appears to be more posterior.

**ANACYRTUS SANGUINEUS**, Cope, sp. nov.

A stout species with large scales. Sc. 12-54-12; radii, D. 9; A. 43; V. 8, reaching anal; P. 16, to middle of ventrals. Back much elevated, dorsal commencing in front of anal (A. i. opposite D. 4), and nearer end of muzzle than basis of caudal by a little. Caudal deeply forked. Depth 2.6 times in length (caudal), and length of head 3.4 times in the same. Eye four times in length of head in adults, equal interorbital width. Operculum and orbital bones rugose.

Premaxillary teeth in two very distinct series, a canine at the inner, and one at the outer extremity of the bone. Maxillary toothed to the end, which is behind the line of the posterior margin of the orbit. Mandibular teeth with two (or three on one side of one) canines on each side.

Color pale, with a large black spot on the line from the front of the dorsal fin; a large black spot at base of caudal fin, from which a faint line extends towards the former spot. Sides of head with purple reflections. Dorsal, adipose, caudal, and anal fins vermilion, the anal with a black border. Total length .133 m.; to basis dorsal .0626; to basis ventral .045; to adipose .10; to basis caudal fin .115.

This brilliantly colored fish is nearest the *A. tectifer*, Cope (Proc. Am. Philos. Soc., 1870, 565), and *A. pauciradiatus*, Gthr. (Catal. B. M. v. 346). It is less elongate than the former, and has a more concave profile; the anal rays are more numerous. From the latter species it is well distinguished by its well-defined exterior premaxillary series of eight teeth, and the more anterior position of the dorsal fin.

Numerous specimens from the Ambyiacu.

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**XIPHOSTOMA TÆDO**, Cope, sp. nov.

D. 10, A. 10; scales of lateral line 75. Last dorsal ray above the fifth anal. Head (without membranous flap) three times in length to basis of caudal; eye 7.6 times in length of head, of which four times enter muzzle (without flap); flap equal one diameter of eye; interorbital space flat, 1.75 times diameter of orbit. Muzzle flat above, decurved, receiving the mandibular teeth within it, striate rugose. Teeth minute, equal. A rudimental dermal flap on mandible. Pectoral fins reaching less than .3 distance to ventrals; rays 15; V. 8; extending half-way to anal. Caudal emarginate. Depth of body at ventrals 7.75 times in length without caudal.

Color light brown above, below white; two series of small brown spots on each side, above. Top of head rosy; dermal flap of muzzle vermilion, black-edged. Opercula golden, suborbital bone with purple reflections. Dorsal fin yellowish, with two brown cross-bands; anal with a median black spot. Caudal fin with middle and tips black, margin and space between, with rays, white.

Total length .203; to orbit .036; to ventral .112; to dorsal .1382; to anal .1432; to caudal fin .178.

Two specimens from the Ambyiacu.

**MYLETES ALBISCOPUS**, Cope, sp. nov.

Discoidal, with small head; anal rays long, the fin half covered with scales. Radii D. 17; A. 36; V. 7. Caudal fin subtruncate. Scales small, 41-100-45. Forty-seven spines in front of the anal fin. Profile scarcely concave, orbit 3.5 times in head, a little less than half the superficial width of the very convex interorbital space. Length of head 3.75 times in total, lacking caudal; depth 1.4 times in same. Anterior teeth separated from posterior. Pectoral fin to ventral, ventral commencing under dorsal. First ray small, not reaching vent. Length .16 m.; to line of dorsal (axial) .065; to line of anal (axial) .09; to caudal .125.

Color silvery, with blue reflections above, and golden below. A black spot on posterior edge of operculum; otherwise immaculate.

Numerous specimens from the Ambyiacu. Two from the Perkins collection lack the opercular spot.

**MYLETES OCULUS**, Cope, sp. nov.

Premaxillary series of teeth in contact. Radii D. 15; A. 24; V. 7, reaching the vent, and commencing below the first dorsal ray. Pectorals reaching base of ventrals. Preanal spines 43. Form stout ovate, dorsal and ventral curvatures equal. Depth 1.75 times in length without caudal; length of head 2.5 times in same; caudal fin bifurcate. Orbit 3.3 times in length of head (of an individual .065 m. long), 1.75 times in the rather flat inter-orbital space. Profile concave, operculum rugose. Depth of above individual .0275 m.; length to dorsal fin .03; to anal .037.

Color dark plumbeous, with a black spot with a wide white bordering ring just above the lateral line below the anterior part of the dorsal fin. Many specimens with vertical dark shades or fasciæ. Anal fin blood-red, black at base.

This species is well distinguished by its stout head and jaws, and especially the ocellus on the side. The details do not agree with those of any described species.

**MYLETES HERNIARIUS**, Cope, sp. nov.

Form subquadrangular or broad diamond-shaped from the angular elevation of the back, and the abrupt prominence of the abdomen. The thoracic outline is concave below the pectoral fins. Radii D. 18; A. 32; ventrals reaching vent, not attained by the small pectorals. Abdominal spines of unusual length, spine-shaped, 46 in number. Depth 1.4 times in length without caudal fin; length of head three times in same. Orbit (in individual of .05 m. in length) 2.6 times in head, less than the slightly convex interorbital space. Profile concave; chin and muzzle projecting. Plumbeous above, silver below; a very few small dusky dots; anal fin blackish.

Length to dorsal fin (of above individual) .022; to anal .027; depth head at preopercular angle .01 m.

The very prominent abdominal saw, and spine-like form of its teeth, distinguish this species. Two specimens.

**SERRASALMO IRIDOPSIS**, Cope, sp. nov.

D. 15-6; A. 34; abdominal spines prominent, forty-one. Depth of body one-half length without caudal fin; length head a little greater than one-third the same. Orbit 3.8 in head, a little less

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than interorbital space. Ventral fin originating opposite front of dorsal; not reaching vent; pectoral reaching ventral. Bones of head striate. Caudal fin openly emarginate. Color pale fawn-color above, below silvery; four longitudinal series of round black spots above lateral line; several scattered spots below it. Opercular apparatus brilliantly colored; upper part of preoperculum and orbital bones green; middle golden, lower part purple and violet. Operculum purple above, vermilion below; interoperculum vermilion; anal fin the same; caudal brown, edged with pale yellow centre.

Total length .104 m.; to dorsal .0535; to ventral .0475; to anal .0615; to caudal .084.

This brilliant species is especially peculiar in the number of its abdomino-thoracic dentations.

From the Ambyiacu.

**SERRASALMO ÆSOPUS**, Cope, sp. nov.

Radii D. 16; A. 32; V. 7; pectoral falcate reaching basis of ventral. Form short, deep, dorsal curve greater than abdominal. Depth 1.66 times in length without caudal, length of head three times in the same. Scales 47-83-36; ventral spines 31. Muzzle very short, only half as long as diameter of bony orbit, which is contained four times in the length of the head, and twice in the interorbital space. Latter convex transversely. Lateral line slightly decurved in the middle. Dorsal fin nearer the base of the caudal (first fulcrum) than the end of the muzzle, by the length of the latter and half the diameter of the orbit.

Color bright yellow, unspotted, except a shade behind the epiclavicle. Caudal fin with a yellow margin and black band within it; anal fin with a dark margin.

Total length .147 m.; to dorsal fin .075; to ventral .065; to anal .088; depth at orbit .028; at first anal ray .073.

From the Marañon between the mouth of the Rio Negro, Brazil, and the Huallaga, Peru. Robert Perkins.

**SILURIDÆ.**

**PSEUDORHAMDIA PISCTARIX**, Cope.

Proceed. Am. Philos. Soc., 1870, 569.

This species presents slight differences in the size of the orbits and relative slenderness of the body, not dependent on age.

1872.]

**PIMELODUS LATERISTRIGA**, Müll. Trosch.

Günth., Catal. v. 118.

Differs somewhat from Günther's description, *i.e.*, in the longer beards and one soft ray less in dorsal and anal fin. Radii D. I. 6, A. 11, V. 6. Maxillary barbels reaching to three-fourths the length of the adipose fin; exterior mentals to end of pectorals.

**DORAS GRYPUS**, Cope, sp. nov.

Lateral shields twenty-eight, short vertically, and furnished with a single strong reverted spine. Tail shielded above and below from opposite the twenty-first. Head broad, flat above, with a short concavity in the position of the fontanelle. Casque broad, obtusely roof-shaped, sending a process back on each side the dorsal fin. Body slender. Pectoral spines very powerful, reaching to beyond dorsal fin (in two specimens), with strong serrations. Dorsal spine strong, longitudinally striate, not serrate. Postclavicular process long and strong, reaching as far as the process of the casque, with an external row of teeth, which are proximally in a groove. Humeral process of coracoid swollen laterally, striate grooved. Top of head rugose. Diameter of eye five times in head (to edge bony operculum), twice in interorbital space, once in muzzle. Preorbital bone with an obtuse vertical ridge. Length of head 3.66 times in length to basis caudal fin, greatest depth 4.2 in same. Radii D. I. 6; C. forked, 15; A. 12; V. reaching to anal 8; P. I. 6. Postcoracoid processes short, smooth, maxillary barbels to middle of pectoral spine.

Color above black, below light brown black-dusted, gular region yellowish. A yellow band on side, margined below by three broad longitudinal black bars. Caudal fin black, yellow medially, anal and dorsal fins black in front, yellow posteriorly; ventrals yellow, with two black cross spots.

Total length 5 inches, = 0.1264 m.; width at humeral swellings .036 m.

This species exceeds many others in the relative size of the spines and casque.

**DORAS BRACHIATUS**, Cope, sp. nov.

A rather large species, of slender form, with smooth front, and very large pectoral spines. Lateral scuta forty, low, flat, and wide, with a flat reverted spine on the middle, the posterior edge

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with three or four serrations near the extremity; three opposite the dorsal fin much elevated, two in front of them small, spineless. Radii D. I. 6; C. + 17 +; A. 11; V. 7; P. I. 8. Dorsal spine very strong compressed, with teeth pointing downwards behind and upwards before; its length one-half length of fish anterior to it. Pectoral spine flat, striate, with strong teeth on both faces, the posterior the longer. Eye looking partly upwards, covered with rather thick cornea 8.5 times in length to bony opercular margin, a little less than half interorbital width. Muzzle flattened and narrowed, the maxillary beards leading to the middle of the humeral process, the mental beards half as long. Rugosity of the casque striate, bifurcating at the fontanelle, and sending an angle to the front of each orbit, and then ceasing. A weak serration of the small preorbital bone visible. Head flat between the orbits, the casque steeply roof-shaped, contracting and then expanding downwards opposite the dorsal spine, but not exceeding it. Humeral spine extending to opposite dorsal; flat, striate; postcoracoid short, covered with smooth skin. Ventral fin commencing some distance behind last dorsal ray, obtuse, not reaching vent, but reached by the pectoral spine. Caudal peduncle short; caudal fin deeply furcate. Adipose fin well developed, but low. Teeth numerous, brush-like.

Total length .382 m. Length to eye .037; to dorsal spine .12; to ventral fin .165; to anal fin .222; to basis of caudal fin .31. Width at humeral swellings .077; height at basis D. I. .095.

Colors bright; above brownish, sides pink, below white. Fins red, except pectoral and dorsal, which are paler.

This marked species is very different in general physiognomy and details from such short, rough, black species as *D. pectinifrons* and *D. grypus*, being elongate in form, and smooth, though well armed. Discovered by Robert Perkins between the mouth of the Rio Negro and the Huallaga, in the Marañon.

**ZATHORAX**, Cope, gen. nov.

Proc. Acad. N. Sci. Phila., 1871, p. 112.

Branchial fissure much contracted. Lateral shields not meeting on the middle line of the back. No adipose fin? dorsal and anal fins short. Spines and postclavicular process strong. Ventrals behind dorsal. Scapular arch dilated below and covered with a dermo-ossification.

1872.]

This genus is *Doras* with the expanded dermo-ossified sternal shield of the following genus *Physopyxis*. It forms a group connecting the two, and differing from the latter in not having the lateral scuta meeting on the dorsal line. In one specimen there is no adipose fin, in a larger there is a rudiment. As in *Doras*, the postclavicular process is more extensively developed than the postcoracoid, while in *Physopyxis* the latter is developed at the expense of the former. The *Zathorax monitor* constitutes specifically a link between such *Dorades* as *D. grypus* and the *Physopyxis lyra*, in being of stouter form than the former, but less squat and toad-like than the latter. It has the comb-like preorbitals of the latter.

Only one species is known.

**ZATHORAX MONITOR**, Cope, sp. nov.

Twenty-five short lateral scuta, each with one strong recurved median spine. Casque broad, furcate to receive the dorsal fin, obtusely roof-shaped to between the orbits, where it is a little concave, weakly rugulose and striate. Preorbital bones with 12 processes above, not dentate on the lower margin. Muzzle broad, short, lips even, mouth reaching to opposite front of preorbital. Beards on the chin normal. Maxillary barbel reaching to posterior margin of orbit, but possibly further in a harder specimen. Orbit 3.75 times in head, 1.66 in interorbital width; head 3.75 times in length without caudal, twice to third lateral scutum. Greatest depth (at dorsal spine) 3.5 in length. Postclavicular spine extending to line of posterior process of casque, furnished with a row of distant strong teeth on the outer edge. Humeral swelling enlarged laterally, giving unusual width to this region. Postclavicular spine short, acute, sternal shield transversely striate, twice as wide as the gular region in front of it.

Radii D. I. 6, the spine trigonal, straight, not serrate before or behind, but striate; C. ?14; A. 12. P. I. 6, the spines large, reaching beyond end of ventrals, with numerous close-set teeth or spines on both edges, and a terminal one; surface striate.

Total length .038 m., width at shoulders .013 m., at canthus oris .0053. Length dorsal spine .008, of head and casque .016. The larger specimen is .052 in length.

Color destroyed by the action of the spirits; pale brown, the pectoral spines dark-spotted.

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**PHYSOPYXIS**, Cope.

Proceed. Acad. Nat. Sci. Phila., 1871, 112. Genus novum doradi affine.

Dorsal fin with strong pungent spine, in advance of the ventrals. Gill openings much reduced, opercular apparatus attached to clavicular arch below. No adipose dorsal; anal fin short; vent median; nares close together, the posterior minute. Barbels well developed, one maxillary and two mental on each side. Mouth terminal, teeth minute in several series.

Sides and dorsal part of the body entirely inclosed by vertical osseous shields. Head and thoracic region inclosed in a trihedral osseous box, composed of the expanded cephalic casque above, clavicular arch laterally, and the immense development of the clavicles and coracoids inferiorly. These form a shield, which extends to beneath the eyes anteriorly, and sends two postcoracoida posteriorly, all entirely involving the derm. Pectoral spines and swim-bladder greatly developed.

This strange genus carries to its highest extreme the peculiar features of *Doras*. Thus the branchial fissures are still more reduced, the operculum being attached all along its inferior margin; the lateral osseous dermal scuta are prolonged upwards to the median dorsal line; the pectoral spines are immensely developed. It differs further from *Doras* in the greater development of the inferior elements of the scapular arch and the entire occupation of the skin by the ossification. The swim-bladder is large, and extends to the skin on each side of the casque and above the humeral processes, and between the long postcoracoid processes on the inferior surface. The osseous box inclosing the anterior half of the body protects this swim-bladder, but the teleologist will suggest that perhaps, on the other hand, the large swim-bladder is necessary to float the heavy shields and defensive spines.

The small body and immense casque give this form a very peculiar appearance, and suggest a miniature iron-clad with mast and outriggers.

**PHYSOPYXIS LYRA**, Cope, sp. nov.

Muzzle short and broadly truncate, about as long as the diameter of the eye, lips even. Interorbital region concave, thrice as wide as the diameter of the orbit, with an oval median fonta-  
1872.]

nelle. Orbit 4.2 times in length to opercular margin. The casque rises from the orbits to the dorsal spine. It is keeled obtusely, or roof-shaped, extends on the sides nearly to the lateral line, and is prolonged into a point on each side of and behind the last ray of the dorsal fin. The humeral portion of the clavicle is much enlarged and dilated horizontally, and is produced into a post-humeral (postclavicular) spine which extends to below the dorsal spine, is sharp-edged, striate, and not serrate.

The inferior aspect of the scapular arch is a transverse shield, convex in front, concave behind, and gently concave inferiorly, two-thirds of its width being composed of the coracoids; the surface punctate. The postcoracoid processes are very long, extending to beyond the bases of the ventral fins; they are curved, and the extremities dilated outwards, so as to present with the thoracic portion exactly the form of the Grecian lyre. The huge prickly pectoral spines curving round on each side, and meeting behind the ventral fins, suggest the wreath which often accompanies the lyre. The surface of the postcoracoid processes is longitudinally striate. A section of the fish in front of the pectoral fins is triangular.

The preorbital bones are well developed; they form an erect transverse crest of eleven long, sharp teeth, and are toothed laterally and below. Casque rugulose.

Radial formula D. I. 4, C. 12, A. 12; V. 6; P. I. 2. The dorsal spine is quite straight, trigonal in section, and longitudinally grooved. The inferior half in front is furnished with stout spines directed upwards; behind smooth. The pectoral spines are very large, curved, and extend to the second or third ray of the anal fin. They are spinous, and longitudinally grooved.

The lateral shields are twenty-three in number, and each is furnished below its middle with a recurved spine as in *Doras*. The surface of the plates is granular. Caudal fin truncate.

Color in front of the dorsal fin dark brown, minutely varied with lighter; a light cross-band from one humeral base to the other, and another between the orbits. Posterior part of the body yellowish, with a dark spot at the base of the dorsal fin; a band on the middle of the side, and one at the base of the tail. Fins brown-dusted; dorsal and pectoral spines brown, yellow cross-banded. Inferior surfaces deep brown, except the osseous portions, which are pale brown.

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	M.
Total length . . . . .	0.035
Length to orbit . . . . .	.0015
“ “ opercular slit . . . . .	.007
“ “ ventral fin . . . . .	.015
“ “ anal fin . . . . .	.0189
“ “ caudal fin . . . . .	.028
“ of dorsal spine . . . . .	.0075
“ “ pectoral spine . . . . .	.0123
“ “ postcoracoid . . . . .	.0082
Width of muzzle . . . . .	.005
“ at humeral knobs . . . . .	.013
“ “ 1st lateral shield . . . . .	.003
Expanse of both pectoral spines . . . . .	.031

Ambyiacu River, Equador. John Hauxwell.

The preorbital comb is like that of *Doras pectinifrons*, Cope, from the same region.

**CALLICHTHYS ASPER**, Q. Gaim.

Günther, v. 225.

**CALLICHTHYS MELAMPTERUS**, Cope, sp. nov.

The head depressed, muzzle broadly rounded. Body strongly compressed; the dorsal line rising steeply and continuously with the profile, to the dorsal fin. Caudal region much compressed; tail openly emarginate. Inferior lip little reverted, bearing no barbels; tip of the muzzle projecting but little beyond the mouth. Inferior barbel extending to near the end of the ventral fin, superior to near the end of the pectoral. Lateral shields 25-24, from supraclavicle. Azygous plates 5. Radii D. 8, A. 1, 6, V. 7, P. I. 8. Dorsal spine like other rays, pectoral toothed within, and with short tooth-like bristles without. Spine of adipose reaching to basis of caudal.

Orbit 3.5 times in length of head, twice in interorbital width. Depth of head more than two-thirds length. Length of head one-third length without caudal, equal depth. Length over all, three inches.

Color dark plumbeous; the preorbital region, and caudal and inferior fins, black.

This species is much more compressed than the *C. asper*. Besides other points, there is one more pectoral ray and a different 1872.]

coloration from the *C. knerii*, Gill, from Trinidad, W. I. Numerous specimens.

**DIANEMA**, Cope, gen. nov.

Allied to *Callichthys*. A single barbel at the extremity of each maxillary bone; two barbels at the symphysis of the mandible; teeth minute, brush-like. Body shields in two series, as in *Callichthys*; postcoracoids dilated into two shields which meet on the median line and involve the derm, as in *Hoplosternum*. Sides of the face not shielded; parietal not reaching base of dorsal fin, but separated by two transverse shields of the sides. Dorsal and pectoral fins with powerful spines, caudal subtruncate. Adipose fin present, pungent.

This new genus, it will be seen, combines in an interesting manner the characters of *Hoplosternum*, Gill, *Brochis*, Cope, and *Corydoras*, Lac. The shielding is of the first, and the fin radii of the last two, while in the peculiar barbels it resembles no other. The relation of these to the double maxillary barbels of *Corydoras* appears to be explained by the structure in the genus *Brochis*, and will be mentioned under that head.

**DIANEMA LONGIBARBIS**, Cope.

Form rounded compressed; head depressed, wide, but abruptly narrowed in front of the nares. Maxillary barbels not reaching the opercular margin, mental to the middle of the pectoral fins. Shields 25-24, azygos four, all nearly smooth. Radii D. I. 7 I.; C. 12; A. 7; V. 7; P. I. 6. The pectoral spine is long and straight, terminating in a point, and is finely and strongly serrate on the inner, and finely bristled on the outer faces. Dorsal spine acute, not serrate. Length of head 3.66 in length without caudal fin, equal depth at dorsal fin. Postorbital width equal .70 length of head, width at nares equal length from muzzle to orbit; orbit 3.75 times in head, 2.5 times in interorbital width. Total length  $3\frac{1}{2}$  inches, or .09 m. Color light yellowish-brown, fins unspotted. The specimen has, however, lost all coloration it might have had, in the spirits.

The dorsal spine is less developed than in the species of *Corydorus*. The posttemporal region is perforated by a few pores.

**BROCHIS**, Cope, gen. nov.

Allied to the last genus. Two barbels at the extremity of the maxillary bone, united by a beard-like looped cord to the symphysis mandibuli, the cord being thus attached at both ends. Teeth rudimental or wanting. Body with two longitudinal series of shields, the postcoracoids expanded and meeting on the median line. Head compressed, the parietal shield only separated from the dorsal spine by the basal azygos shield of the latter. Sides of head shielded to the mandibles. Dorsal and pectoral fins with strong spines; adipose present, purgent. Caudal fin emarginate.

This genus is allied to *Corydoras*, but differs from it as *Hoplosternum* does from *Callichthys* with the addition of the peculiar pendent dermal loops of the mandible. These loops are confluent at the symphysis mandibuli, and from that point to their union with the maxillary barbels resemble exactly the mental barbels of *Dianema*. It is difficult to avoid believing that these loops are homologically the recurved inferior lips of *Corydoras*, separated from the greater part of the ramus, but joining again at the canthus of the mouth and giving rise to the inferior barbel. It then follows with much probability that this connection also is severed in *Dianema*, and the inferior maxillary barbel remaining as before continuous with the mandibular loop, becomes the mental barbel. In the shielding of the head, *Brochis* is like *Corydoras*, while *Dianema* is like *Hoplosternum*, so that the affinities are complicated and not readily expressed by a linear arrangement.

**BROCHIS COERULEUS**, Cope, sp. nov.

Form short, stout, elevated, and compressed. Head steep, gently convex above the orbits and concave above and below them, and tapering to a very narrow muzzle, which overhangs the mouth a little. Scuta, 23-21, smooth, with one oval supratemporal shield only. Nares small, close to the orbits. One large combined pre- and suborbital shield; a large subtriangular loreal plate. Maxillary barbels extending to opposite the middle of the orbit. Shields of the head, with the postcoracoids, slightly rugose.

Length of head one-third length without caudal fin, 1.33 times in greatest depth at basis of dorsal. Orbit four times in head, more than twice in muzzle, which equals the width of the convex interorbital space. The dorsal outline is strongly arched, de-

scending behind from the middle of the dorsal fin. Raddi D. I. 11, I., without adipose portion; C. 14; A. 8; V. short, 6; P. I. 9. Dorsal spine moderate, serrate behind and smooth before, pectoral stronger, finely but strongly serrate behind, smooth in front; it extends to or a little beyond the middle of the ventral in all our specimens. Length, three inches; depth, one inch.

Color of body and sides above, with sides of head, metallic blue; below, yellowish. Fins unspotted.

This elegant species appears to be very common in the tributaries of the Ambyacu.

**BROCHIS DIPTERUS**, Cope, sp. nov.

This species is represented by a single specimen, which differs in several points from the type of the genus. These are: 1st, the existence of a well-developed adipose membrane to the adipose fin; 2d, the existence of only ten rays in the first dorsal fin; 3d, the thick attached inferior lip with two median beards. The lateral shield of the muzzle is more completely united with the surface of the ethmoid than in similar specimens of the *B. coeruleus*, but not more so than in larger specimens. Scuta 24 above. Pectoral and dorsal spines serrate within. Color and proportions as in *B. coeruleus*, the added adipose fin having a black border behind.

The characters of seven specimens of the type species are constantly different from this one.

**CORYDORAS**, Lacep.,

Differs from *Callichthys* in the prolongation of the supraoccipital shield upwards between the lateral shields to near the base of the dorsal ray, and in the possession of strong dorsal and pectoral spines.

The species of this genus are referred to a section of *Callichthys* by Dr. Günther, which he characterizes by the compressed form of the head. I think they constitute a natural genus characterized as above, and would admit species having the above peculiarities into it, no matter what the form of the head. The new species here described, however, agree with those already known in this compression of the head and body. The genus differs from *Brochis* in the non-shielding of the intercoracoid re-

gion, and of the sides of the muzzle, these regions being inclosed by membrane only.

One species, *C. semiscutatus*, Cope, has the postcoracoid processes much widened and with a superficial rugose ossification of the derm, thus approaching *Brochis*. The median portion of the thorax is, however, not inclosed. The sides of the head are also more fully ossified than in other species.

The typical species present interesting modifications of the inferior lips. Thus, that of *C. ambiacus* is broadly reflexed, of equal thickness, and furnished on its posterior border with two short barbels. In *C. trilineatus* the lip is recurved, and without barbels, but the margin is thickened into a cord, which is connected with the edge of the mandible by a membrane so attenuated as to be easily ruptured, when the arrangement resembles closely that seen in *Brochis*. In the third group the inferior lip appears to be entirely wanting. I add to the characters of the four new species here described those of the three recorded by Günther, as far as I can learn them.

#### GROUP I.

Head longer than high; barbels to middle of orbit; "A. 6."

C. PALEATUS.

Head higher than long; barbels to operculum; A. I. 6. Muzzle long; dorsal spine moderate serrate; irregularly spotted. C. AMBIACUS.

#### GROUP II.

Muzzle short, convex; barbel to posterior edge of orbit; dorsal and anal spines shorter, former smooth; a light lateral band, divided and margined by a black line.

C. TRILINEATUS.

#### GROUP III.

Muzzle produced, acute, concave; barbel to middle of orbit; dorsal and anal spines short, former serrate; no azygus shields; uniform, with a pale lateral band.

C. ACUTUS.

Muzzle short, acute, concave; barbels to middle of orbit; dorsal and anal spines very long, former smooth; four azygus shields; olive, black-dotted.

C. AMPHIBELUS.

#### GROUP ? ?

"Head high as long; barbels to gill opening; A. 8." C. PUNCTATUS.

"Similar to *C. paleatus*, but fins immaculate; A. I. 6." C. AENEUS.

"Head higher than long, muzzle short convex; barbels to below eye; dorsal spine long, serrate; anal short, four or five azygus plates; anterior scutes with vertical rows of black spots." C. ARMATUS.

1872.]

**CORYDORAS SEMISCUTATUS**, Cope, sp. nov.

Radii D. I. 11, I., no adipose portion; A. I. 6; V. 6; P. I. 10. Scuta 23 above, including postcephalic, no azygus shields. Pre-orbital bone and shield single, large, extending half way from orbit to maxillary, and downwards, .4 way to line of mandible. Postcoracoid processes wide, with convex inner margins which are separated by a wide fissure, the surface striate rugose, no lateral shield separates them from the base of the ventral fins.

Profile steep, arched in front of nares; muzzle contracted, pointed. Orbit 3.5 times in head, 1.66 times in muzzle and inter-orbital space. Head 2.8 in length without caudal fin; depth 2.4 times in same. Inferior lip beaded on margin, which easily separates, forming a loop; no median barbels visible.

General color above pearly or nacreous-blue, with metallic reflections on postclavicle and operculum.

This species shows a marked tendency to the genus *Brochis* in the increased extent of the osseous shields of the thorax and sides of the head. The enlarged number of dorsal fin rays is another indication of such affinity. It represents very closely, I have no doubt, a young stage of *Brochis coeruleus* in the incompleteness of the shield development, and might, by some, be regarded as that animal itself. Specimens of the latter of nearly the same size betray no approach to it in characters, and experience elsewhere warrants the opinion that the parallelism will be seen at a far younger age than any of our specimens represent.

**CORYDORAS PALEATUS**, Jen.

*Callichthys paleatus*, Jenyns Voyage Beagle Fishes, p. 113. Günther, Catal. B. M. v. 230.

**CORYDORAS AMBIACUS**, Cope, sp. nov.

Form stout, compressed, dorsal line arched, front convex at orbit, slightly concave on the elongate muzzle. End of muzzle a little projecting beyond mouth, its outline gradually expanding to orbit. Interorbital region transversely convex. Lower lip widely reverted, its marginal barbels each shorter than the diameter of the eye. Latter 3.33 times in length of head, 1.75 times into muzzle and interorbital width. Length of head 3.2 times in length without caudal fin, and 1.25 in depth of body.

Lateral shields 22-21; azygus shields one basal and one flat.

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Radii D. I. 7. A. I. 6; V. 6; P. I. 9, the spine acute, serrate on inner side, reaching half-way along ventral. Anal spine short, weaker than adipose dorsal spine. Latter with adipose appendage.

Straw color, with numerous indefinite brown spots on the sides. Dorsal fin with a large black spot covering anterior half, which also expands on the dorsal region round the base of the fin. Four vertical brown bands on caudal fin; anal spotted. Cheeks with blue reflections. Length .058 m.; depth at D. I. .018 m.

**CORYDORAS TRILINEATUS**, Cope, sp. nov.

This species is easily distinguished from the other species here noticed, by the short, abruptly decurved muzzle, and three longitudinal lateral lines.

The head is much deeper than long, and enters the length without caudal fin 3.5 times, and the greatest depth 1.5 times. Orbit 2.75 in head, 1.5 in convex interorbital space. Lateral shields 21-20; two highly keeled azygus. Radii D. I. 7; A. I. 6; V. 6; P. I. 6, the spine acute, without serrations; the dorsal spine serrate throughout behind, not extending to the base of the adipose spine. Latter much larger than anal spine, attached to an adipose portion.

Light straw-colored, brownish above, a yellowish lateral band with rather faint brown margin above and below, and blackish median line. A very black spot on *the ends* of the soft dorsal rays; tail deeply forked, with five vertical bands; anal spotted. Some longitudinal lines on the side of the face. Length .049 m., depth .015 m.

The mouth in this species is quite inferior. The peculiar structure of the lower lip, which is a festoon supported by a thin membrane, I have verified on two individuals. The thick margin on each side bears a very short barbel.

**CORYDORAS ACUTUS**, Cope, sp. nov.

A stout species, differing from the others, especially in the attenuation of the muzzle, which viewed from above is narrow, and contracted abruptly from the general outline. Mouth inferior, lower lip wanting or not reverted. Head 3.1 times in length without caudal, 1.33 times in depth. Orbit three times in head, 1.33 times in the nearly flat interorbital space. Lateral scuta 22-21; no azygus plates. Radii D. I. 7; A. I. 6; V. 6; P. I. 5, the 1872.]

spines serrate on the inner side. Dorsal spine serrate posteriorly on the distal half. Adipose spine without fin, stouter than anal spine. Caudal fin furcate.

Color olive (faded), a faint pale band on each side; a large black spot on distal part of dorsal rays. Caudal with four vertical bars; clavicle and operculum with blue reflections. Length .051 m., depth .0155 m.

**CORYDORAS AMPHIBELUS**, Cope, sp. nov.

A species much like the last, but differing in its longer spines, short muzzle, and numerous azygus shields, etc. Form the stoutest in the genus, profile descending steeply from the dorsal fin to below the nares, then concave, and descending to the narrow muzzle. Head three times in length lacking caudal, 1.4 times in depth. Orbit 3 times in head, 1.6 times in interorbital width. Lateral shields 21-19, four flat azygus. Radii D. I. 7; A. I. 6; V. 6; P. I. 6, the spine serrate within. Dorsal spine serrate posteriorly, elongate, reaching the adipose spine when depressed. Adipose long without fin, but shorter than the slender spine of the anal. Total length .037 m.; depth .0124 m.

Color light olive, face with blue reflections. Numerous small black dots on the side shields, which are only wanting on the middle line of the side. Dorsal with a black spot on the ends of its radii, and another at the base of its spine. Caudal with four vertical cross-bars.

**CORYDORAS PUNCTATUS**, Bloch.

*C. geoffroyi*, Lacep. *Callichthys punctatus*, D'Orb. Cuv. Val. Günth. v. 229.

Surinam, Monte Video.

**CORYDORAS ÆNEUS**, Gill.

*Hoplosoma æneum*, Gill., Ann. Lyc. N. Y., 1851, p. 403. *Callichthys*, do. Günther, l. c.

Trinidad, W. I.

I cannot learn the structure of the lips in this and the following species:—

**CORYDORAS ARMATUS**, Günth.

*Callichthys armatus*, Gthr., Pro. Zool. Soc., Lond., 1868, p. 230. Fig. 1. Xeberos on the Huallaga, Peru.

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**CORYDORAS SPLENDENS**, Cast.

*Callichthys splendens*, Castelnau, Anim. Nouv. Rar. Am. Sud. 39, Tab. 18, f. 3.

Rio Tocantins.

**OTOCINCLUS**, Cope.

Proc. Acad. Nat. Sci., Phila., 1871, p. 112.

Subfamily *Hypostomatina* of Günther's system. Ventral fins immediately below the front of the short dorsal; branchial fissures extending a little below pectoral fins. Vent a little behind the middle of the body. Body shielded with several series of plates, the anterior less numerous. Thoracic and abdominal regions with numerous shields. No adipose fin; dorsal with weak, pectoral with strong spine. Inter-operculum horizontal, beneath the orbit, unarmed. No barbels. The teeth as in allied genera. Post-temporal region pierced with numerous foramina, forming a sieve, which only separates the water from a large cavity on each side of the modified anterior vertebræ, by the thin skin which covers it.

This genus is allied to *Hypoptopoma*, and apparently to *Rhinelepis*. The arrangement of the opercular bones is like that seen in the former (see figure of *H. bilobatum* in Proc. Am. Phil. Soc., 1870, p. 567), while the absence of adipose fin and general rugosity are seen in the latter. Neither exhibits the remarkable perforation of the post-temporal plate. This is, in the only known species, so extensive as to cover the whole plate to the orbit, which becomes thus a skeleton sieve of some beauty, through which the cavity within may be plainly seen. Its use is unknown, but may be connected with the function of hearing, as the genus has no swim-bladder.

**OTOCINCLUS VESTITUS**, Cope, sp. nov.

Body compressed, head elongate oval, neither elevated. Muzzle rounded-acuminate, projecting much beyond mouth, nareal opening near orbit. Loreal region vertical, a canthus rostralis; muzzle a little convex between nares and orbits; profile gently arched from dorsal fin to end of muzzle. Scales obtusely angulate behind, the exposed surface covered with distant elongate prickles. Four rows on the caudal peduncle, the third from above bearing some tubes of the lateral line, and becoming more elongate and oblique anteriorly, until from the point of the pectoral 1872.]

they occupy the entire inferior half of the side. The second does not enlarge till near the postcephalic plates, where two or three occupy the upper half of the side. Longitudinal line containing twenty-one. Those of the superior and inferior series are angulate near the margin of the peduncle, and meet on the superior and inferior median lines by a straight suture. Thus these faces form distinct but slightly convex, narrow planes. Parietal shield broader than long, postparietal large, its apex separated from D. I. by two cross-shields, the first wider. A large shield on each side the postparietal. The whole of this region swollen, greatest width of head at the sieve.

Orbit three times in head, twice in interorbital width; head 3.5 times in length, without caudal fin; depth 4.5 times in same. Caudal fin well developed, deeply forked. Dorsal elevated in front; radii I. 6; C. 17; A. I. 5; V. I. 5; P. I. 5; the spine flat, reaching the basal fourth of the ventrals, with short spines outside which become teeth at the end; within smooth. Scapular arch rather narrow below, followed by three series of shields, of which the lateral are long and narrow. These gradually diverge and admit three series of small scales, which again diminish and terminate in an obtuse point between the ventral fins. This leaves with the ends of the lateral shields a Y-shaped naked space, at the end of which is situated the vent. These are covered with numerous short bristles, like the scales of the dorsal region. The head, especially the muzzle, and more particularly the sides of the latter, are covered with many short, closely set, spiny bristles, which give the whole fish a hoary appearance when dry. Spines of fins also hirsute. Teeth bristle-like, those of the mandibular rami opposed to each other.

Yellowish-brown above, browner on the head, darkest on the lores. Sides and below bright yellow, a weak dark shade on lateral line, and large black spot at base of caudal. Fins unspotted. Total length .04 m.; length to anal fin .02; width of head behind .007.

Tributaries of the Ambyiacu.

**LIPOSARCUS VARIUS**, Cope, sp. nov.

Radii D. II. 13, I.; C. I. 14, I.; A. 5; V. I. 5; P. I. 6. Dorsal longer than high, basis nearly equal length in front of it. Pectoral spine to middle of ventral; superior caudal ray shorter

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than inferior. Scuta l. l. 28, l. tr. 4. Inferior regions granular; dermo-ossification of head extending to inferior plane all around, Orbit small, three times in interorbital width, five times in head, width a little greater than length. A marked canthus rostralis to beyond nares; loreal region steep, concave. An occipital keel, nuchal shields two-keeled. Elevation at latter, equal length muzzle and orbit.

Scales rugose, with a serrate median keel ending in a point.

Above, brown; below, yellowish-brown, closely spotted with dark brown, most coarsely on the belly, and finely on the head, leaving vermicular interspaces; eight rows of black spots on the dorsal fin. Other fins, except the caudal, closely black-spotted.

Length .18 m.; to anal fin .085; to mandible .01.

Numerous young specimens of this species, the largest .085 m. in length, display the following characters of immaturity. The inferior surfaces are smooth, and in the smaller the dermo-ossification of the loreal region exists only in spots, and in still smaller is wanting.

Two large specimens from Perkin's expedition have the humeral width and the total length, the base of the dorsal fin enters the same 3.75 times, and is equal the length of the pectoral spine, and the greatest depth of the body enters six times. The specimens agree with Castelnau's *L. pardalis* in having dorsal radii 1.12, but differ in having no keel on each side of the back posterior to the dorsal fin, and in having large spots on the belly, not "punctæ." The former character I derive from Castelnau's figure only.

The young of a second species of this genus occurs in the collection.

**PLECOSTOMUS BISERIATUS**, Cope, sp. nov.

Radii D. I. 7; A. 5; V. I. 5; P. I. 6. Lateral series of scuta 28, three rows between ventral and dorsal fins. Elevation of first dorsal ray equal length of head; length of basis equal to distance from spine of adipose, and 1.66 times length of head and nape. Scuta between dorsals 8, between anal and caudal 16. Pectoral spine to basis of ventral. Scuta not carinate, coarsely striate, the striæ terminating in a few small spines.

Head short, entering length without caudal fin 4.5 times, and a little less than width. A postorbital and orbito-nareal angle, rim of orbit elevated above front. An obtuse median occipital

1872.]

elevation, nuchal scuta not keeled. Orbits four times in head, 2.5 times in interorbital space. Muzzle regularly acuminate, a triangular spot on extremity, smooth. Margins of muzzle not spinous. Inferior surfaces rugose, except a smooth band surrounding posterior lip, and a quadrate area within ventral fins. Lip entire; barbels short.

Inferior caudal ray one-quarter longer than superior, no long bristles on it or the ventral.

Total length 1.55 m.; do. to dorsal fin .045; to anal ; humeral width .07. Color yellow; below white, immaculate. Above with three rows of ill-defined blackish spots at the unions of scales, the inferior wanting behind the line of the dorsal fin. Head above with many close brown dots. Dorsal fin with two rows of blackish spots between each pair of rays; one series between the caudals. Twenty-eight teeth on each ramus mandibuli.

From the Amazon, from Robert C. Perkins. This species is especially distinguished by its short head, and by the characters of squamation of lower surface, color, etc.

**PLECOSTOMUS SCOPULARIUS**, Cope, sp. nov.

Proc. Acad. Nat. Sci., Phila., 1871, p. 55.

Is represented by a number of similar young individuals. They differ in having a more slender muzzle, and dorsal radii II. 12, I. Ventrals also I. 5.

**CHETOSTOMUS**, Tsch. Heckel.

There appear to be five nearly related species in the collection from the Ambyiacu, and I cannot find that any of them have been noticed by authors. Their characters may be summarized as follows:—

I. Muzzle naked, D. I. 7.

Muzzle with tentacles; eye 3.33 times in interorbital space; head  $2\frac{1}{3}-\frac{1}{2}$  times in length (without caudal). Head wide. Black below, white-dotted.

C. ALGA.

II. Muzzle with a broad naked marginal band; no tentacles; D. I. 7.

Eye three times in interorbital width; head broad, short, 3.75 times in length; l. l. 23. Brown, with indistinct pale spots; uniform below.

C. MALACOPS.

Eye three times in front, head wedge-shaped, roofed in front, 3.5 times in length; naked band narrower; blackish, white-dotted below.

C. TECTIROSTRIS.

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Eye 2.33 times in front; head short, contracted at the front, four times in length; canthus rostralis vertical concave; brown, with many large oval pale spots above only. C. VARIOLUS.

III. Unossified margin of muzzle exceedingly narrow, no tentacles, D. I. 7. Head short, broad, 4.25 times in length; eye 2.66 in front. Black, below brown; small. C. SERICEUS.

The smallest of these species, it will be observed, has the most complete dermo-ossification, and the largest the least. The next largest species, *C. tectirostris*, is next most fully ossified, while the *C. malacops*, with but little ossification, is after *C. sericeus*, and *C. variolus* the smallest. So there is no relation between the ossification and the size.

It may be observed that these species all agree in many points not above mentioned, viz.: Anal radii V.; V. I. 5; P. I. 6; and in having the inferior lobe of the caudal longer than the superior. Thorax and belly naked; lateral lines 23-4.

**CHÆTOSTOMUS ALGA**, Cope, sp. nov.

Width of head 3.33 times in length without caudal. Preopercular spines thirteen, of which two posterior are longer, and extend a little beyond the line of the orbit. Muzzle with numerous tentacles on the margin and sides, and a V-shaped series above of larger size, the largest in front at the apex of the V. Dorsal spine a little longer than base of fin, one-half length; pectoral spine extending to basal third or two-fifths of ventral spine. Scuta with ten serrate subequal ridges, each terminating in a spine. The ossification of the derm forms only a narrow band in front of nares and orbit.

Total length .165 m. I associate with this species a second specimen, which agrees in every respect except in wanting tentacles. This is probably, as Günther states of *C. cirrhosus*, the female.

This species is apparently near the latter species, but has a shorter body.

**CHÆTOSTOMUS MALACOPS**, Cope, sp. nov.

The lores are naked to near the nares, but the ossification extends in an angle to the middle of the muzzle. Width of head

3.4 in total without caudal. Ten principal bristles, the longest not extending to hinder margin of orbit. Dorsal spine longer, 1.5 times in length anterior to it; pectoral reaching beyond base of ventrals. Ten plates from anal to caudal, five between dorsals. Color brown, with many closely placed yellow spots. Length .097 m. With the last; two specimens.

**CHÆTOSTOMUS VARIOLUS**, Cope, sp. nov.

This species has a much narrower unossified labial margin than the last, the muzzle being entirely covered above to near the lip. Thirteen principal opercular spines which do not extend beyond the line of the orbit; three of them longer and subequal. Loreal region vertical. Scuta between dorsals 6, between anal and caudal 10. Dorsal spine 1.5 times length from its base to muzzle. Pectoral spine a little beyond base of ventral. Ridges of scuta represented by rows of bristles, which give them a hoary appearance. No keels.

Length .068 m. Color bright brown, with numerous large round yellow spots; belly unspotted. With the last.

**CHÆTOSTOMUS TECTIROSTRIS**, Cope, sp. nov.

Naked labial band as wide as space between nares and orbit. Only eleven preopercular spines, of which two posterior are subequal, longer, and reaching a little beyond line of orbit. Loreal region oblique, nearly plane. Dorsal spine 1.66 times in length in advance of it. Pectoral spines to a little beyond ventral. Scuta between dorsals 5, behind anal 10. The scuta are serrate ridged as in *C. alga*. The muzzle is ridged on the median line, and the sides slope gradually on each side; no other ridges on the head.

Black, with minute yellow dots above and below. Length .13 m., greatest width of head .031. Two specimens.

**CHÆTOSTOMUS SERICEUS**, Cope, sp. nov.

This species has a more elongate body than the others here described, the length containing that of the head 4.25 times, and the width 3.5 times. The head is thus wide and flat, and the naked portion is reduced to a very narrow band along the margin of the muzzle. Latter convex in section, loreal region concave. Eleven spines, the posterior not quite reaching line of posterior

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rim of orbit. Dorsal spine 1.5 times in length in front of its base; pectoral scarcely beyond base of ventral. The ridges of other species are represented by rows of bristles. No ridges on the head. Color black, unspotted, or in a smaller specimen with faint pale spots above. Length .067 m. Two specimens with the preceding.

This species and the *C. malacops* might have been regarded as the young of *C. tectirostris* and *C. alga*, respectively, were it not that the larger individuals possess the characters of immaturity exhibited by other animals, viz., larger head, and less ossification of the derm of the muzzle.

**LORICARIA ACUTA**, Cuv. Val.

XV. 472; Gthr., Catal. B. M. v. 258.

From the Ambyiacu.

**PARIOLIUS**, Cope, gen. nov.

Allied to *Trichomycterus*. Ventral fins present, anterior to the short dorsal. Anal fin short; vent situated beneath the dorsal fin; no adipose fin. No nasal barbel, one maxillary and two lateral mentals. No armature on any of the opercular bones. Teeth in brush-like series.

This genus is allied to *Trichomycterus* in the extensive branchial fissures and other characters, but differs in the absence of armature of the head, and number and position of tentacles.

**PARIOLIUS ARMILLATUS**, Cope, sp. nov.

Head flat rounded, eyes small, superior, covered by the skin. Head 4.5 times in length to basis of caudal fin. Depth at D. I. one-half length to basis pectoral fin; width of head two-thirds the same distance. Interorbital width 3.66 times in length of head. Maxillary and external mental barbels extending beyond basis of pectoral; inner mental barbel on half the same. Radii D. 7; P. 8; V. 6; A. 11; caudal acuminate. Skin entirely smooth.

Color dark-brown, nearly black on the top of the head; under surfaces from anus brownish-yellow, brown punctulate. A broad yellow collar extends from the under surface on each side across the bases of the pectoral fins and the vertex. A vertical dark spot on base of caudal; fins brown-spotted.

	M.
Total length . . . . .	. 0.041
Length to opercular edge . . . . .	. .0078
“ pectoral fin . . . . .	. .008
“ dorsal . . . . .	. .0158
“ anal . . . . .	. .0245
“ caudal . . . . .	. .033

From the Ambyiacu, Jno. Hauxwell.

#### PARIODON MICROPS, Kner.

Sitzungs. Wien. Acad., 1855, p. 161. Günther, Catal. B. Mus. v. 275.

A fine specimen of this fish was obtained by Robert Perkins. It is nearly allied to *Stegophilus* Rhdt., and belongs to the *Stegophilina* of Günther. The latter author, however, places it in his *Trichomycterina*, a step calculated to mislead the student, as it contradicts its natural characters. Günther does not appear to have seen the fish, and perhaps Kner omits mention of the characters necessary to decide the question. It possesses the very posterior vent, and the gill covers united with the throat found by Günther to define the *Stegophilina*.

### SYMBRANCHIDÆ

#### SYMBRANCHUS MARMORATUS, Bl.

The fishes of the Ambyiacu, so far as made known by the preceding investigation, are referable to eight families, fifty genera, and seventy-four species. These are distributed as follows:—

	Gen.	Species.
CHROMIDIDÆ,	7	15
CLUPEIDÆ,	1	1
OSTEOGLOSSIDÆ,	1	1
STERNOPYGIDÆ,	2	3
ERYTHRINIDÆ,	2	2
CHARACINIDÆ,	21	29
SILURIDÆ,	15	24
SYMBRANCHIDÆ,	1	1

Forty-seven of the above species and nine of the genera are new to science, and are referable to the following families:—

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	Gen.	Species.
CHROMIDIDÆ,	0	9
ERYTHINIDÆ,	0	1
CHARACINIDÆ,	3	16
SILURIDÆ,	6	20

The general character of this list is that of any other part of the Amazon basin, presenting peculiarities in peculiar species and in genera not found in the lower Amazon. Such genera among Characindæ are *Triportheus*, *Megalobrycon*, *Aphyocharax*, *Iguanodectes*, and *Stethaprion*; among Siluridæ, *Dianema*, *Brochis*, *Zathorax*, *Physopyxis*, *Otocinclus*, and *Pariolius*. A genus (*Characidium*) previously only known by one small species from a Brazilian coast stream, has its range greatly extended by the discovery of a species in the Ambyacu.

The species contained in the Perkins collection are as follows:—

#### CHROMIDIDÆ.

PTEROPHYLLUM SCALARE, C. V.

SYMPHYSODON DISCUS, Heck.

CICHLA OCELLARIS, Bl. Schn.

GEOPHAGUS PROXIMUS, Cast. Radii D. XVII–XVIII–11; A. III–8. Scales 6–34–12, upper and lower halves caudal fin scaly to near end.

HYGROGONUS OCELLATUS, Agass.

#### SCIAENIDÆ.

One species.

#### PLEURONECTIDÆ.

One species.

#### OSTEOGLOSSIDÆ.

OSTEOGLOSSUM BICIRRHOSUM, Vand.

#### CHARACINIDÆ.

CURIMATUS CYPRINOIDES, L.

HEMIODUS MICROLEPIS, Kner.

TETRAGONOPTERUS CHALCEUS, Artedi.

MYLETES ALBISCOPIUS, Cope.

MYLETES BIDENS, Spix.

MYLETES, sp. nov.

1872.]

- SERRASALMO ÆSOPUS, Cope.  
SERRASALMO HUMERALIS, Kner.  
SERRASALMO NATTERERI, Kner.  
HYDROLYCUS SCOMBEROIDES, Spix.  
RÆBOIDES RUBRIVERTEX, Cope.

**SILURIDÆ.**

- CETOPSIS CÆCUTIENS, Licht.  
PARIODON MICROPS, Kner.  
PIRAMUTANA, sp. nov.  
CALLOPHYSUS LATERALIS, Gill.  
PHRACTOCEPHALUS HEMILIOPTERUS, Bl. Schn.  
RHINODORAS NIGER, Valenci.  
DORAS BRACHIATUS, Cope.  
PLECOSTOMUS SCOPULARIUS, Cope.  
PLECOSTOMUS BISERIATUS, Cope.  
LIPOSARCUS VARIUS, Cope.

## EXPLANATION OF THE PLATES.

## PLATE III.

Fig. 1. *Doras pectinifrons* Cope.

## PLATE IV.

Fig. 1. *Zathorax monitor* Cope; *b* from below; *c* from front.

" 2. *Otocinclus vestitus* Cope; *b* from above; *c* head, side view.

## PLATE V.

Fig. 1. *Physopyxis lyra* Cope; *b* from below; *c* from front.

" 2. *Chatostomus malacops* Cope; *b* from below.

## PLATE VI.

Fig. 1. *Corydoras semiscutatus* Cope; *b* from below.

" 2. *Corydoras trilineatus* Cope; *b* from above; *c* from below.

## PLATE VII.

Fig. 1. *Dianema longibarbis* Cope; *a* from above; *b* from below.

" 2. *Brochis coeruleus* Cope; *a* from above; *b* from below.

## PLATE VIII.

Fig. 1. *Iguanodectes tenuis* Cope (adipose fin omitted by artist); *1a* dentition.

" 2. *Characidium ethcestoma* Cope; dentition.

" 3. *Triportheus albus* Cope; dentition.

## PLATE IX.

Fig. 1. *Anacyrtus sanguineus* Cope.

" 2. *Serrasalmo iridopsis* Cope.

" 3. *Brochis coeruleus* Cope.

## PLATE X.

Fig. 1. *Crenicichla anthurus* Cope.

" 2. *Megalobrycon erythropterum* Cope.

## PLATE XI.

Fig. 1. *Geophagus badiipinnis* Cope.

" 2. *Uarus centrarchoides* Cope.

" 3. *Acara sypsilus* Cope.

" 4. *Acara flavilabris* Cope.

## PLATE XII.

- Fig. 1. *Myletes albiscopus* Cope.  
 " 2. *Myletes oculus* Cope.  
 " 3. *Myletes herniarius* Cope.

## PLATE XIII.

- Fig. 1. *Megalobrycon melanopteron* Cope.  
 " 2. *Xiphostoma tado* Cope.  
 " 3. *Characidium etheostoma* Cope.

## PLATE XIV.

- Fig. 1. *Triportheus flavus* Cope.  
 " 2. *Triportheus albus* Cope.  
 " 3. *Chalcinus culter* Cope.  
 " 4. *Callichthys melampterus* Cope.  
 " 5. The same; head from above.

## PLATE XV.

- Fig. 1. *Doras grypus* Cope.  
 " 1a. *Do.* from below.  
 " 2. *Chatostomus tectirostris* Cope.  
 " 3. *Chatostomus alga* Cope, from above.

## PLATE XVI.

- Fig. 1. *Plecostomus scopularius* Cope; one-fourth natural size.  
 " 2. Same from below.

## PLATE XVII.

- Fig. 1. *Nothopsis rugosus* Cope.  
 " 2. *Do.* head from side.  
 " 3. *Do.* " " above.  
 " 4. *Do.* " " below.  
 " 5. Dentition of upper jaw and palate.  
 " 6. *Trigonocephalus atrox* Cope, var. from Central America.